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ABSTRACT

This study examined the self-regulated strategies college students used as they read their textbooks in preparation for examinations, noting whether they adapted these strategies across the semester. Eight students completed three think aloud sessions across the course of a college class. Each think aloud involved participants studying their textbooks in 45-minute sessions held 1 or 2 days prior to the exam. The students were tested individually and audiotaped. They were instructed to read their textbooks aloud and to state whatever was on their mind as they read. Researchers organized their verbal comments into four general categories for analysis: use of prior knowledge, elaboration upon text information, deliberate strategy use, and text analysis. There were strong correlations with achievement for prior knowledge and elaboration but not for deliberate strategy use or text analysis. Three of the students showed adjustment of their studying across the semester. Qualitative analysis of the think-aloud protocols revealed several themes. The most important of those was that the quality of the approach was what really mattered, not simply the presence of the categories. For example, prior knowledge could be used to facilitate comprehension or it could interfere with understanding the author's point. (Contains 20 references.) (SM)

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Running head: TEXTBOOK READING

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Self-regulation of textbook reading: A think-aloud study

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Abstract

To examine the strategies students use as they read their textbooks in preparation for examinations, and to determine if students adapt these strategies across the semester, eight students completed three "think aloud" sessions across the course of a college class. Students were required to study their textbooks in 45-minute sessions held one or two days prior to each exam. Verbal comments were organized into four general categories for analysis: use of prior knowledge, elaboration upon text information, deliberate strategy use, and text analysis. Strong correlations with achievement were found for prior knowledge and elaboration, but not for strategy use text analysis. Three of the 8 participants showed adjustment of their studying across the semester. Qualitative analysis of the think-aloud protocols revealed several themes. The most important of these is that it is the quality of the approach that really matters, not simply the mere presence these categories. For example, prior knowledge can be used to facilitate comprehension or it can interfere with understanding the author's point. Implications for teaching study strategies and models of self-regulation are briefly discussed.

Self-regulation of textbook reading: A think-aloud study

How do students read their textbooks as they prepare for tests? Do they use the cognitive and metacognitive strategies described in models of self-regulated learning (Ertmer & Newby, 1996; Winne,1995; 1997)? Previous studies of college students using survey techniques have found little evidence of self-regulation as they prepare for classroom tests (Barnett, 1998). Rather, college students were found to cling to relatively shallow learning tactics that they "just always use." The questions addressed in this paper are whether students use deep, active strategies and if they regulate their own studying by modifying their approach as they receive performance feedback.

Models of self-regulated learning (Butler & Winne, 1995; Pressley & Afflerbach, 1994) assume that students actively control their own cognitive and affective processing. Expert learners are described in these models as employing a range of strategies and mindfully planning, monitoring, and revising their strategies (metacognition) to control progress towards instructional goals. On the affective side, self-regulated learners are characterized as intrinsically motivated, task-oriented, and in control of emotional difficulties.

These various components of self-regulation have been linked to academic success. For example, using task appropriate strategies is related to achievement (Weinstein & Mayer, 1986), as are the metacognitive acts of planning and monitoring (Pintrich & De Groot, 1990). Self-regulated learners are more likely to seek help when it is appropriate (Newman, 1994). Self-regulation is correlated with self-efficacy, intrinsic motivation, and expectations of success (Schunk, 1994; Wigfield, 1994). In short, the idealized self-regulated learner the independent, motivated learners we love to find in our classes.

While students have the competence to be self-regulating, their performances are not always so wonderful. One reason is the lack of motivation (Rothkopf ,1988), especially when stategies require time and effort (Winne, 1995). A second difficulty is that experts typically domain-specific strategies. Students may not have the expertise to make them work (Alexander, 1995).

A third factor is that students attempt to reach their own goals (that do not always match with those of their instructors) (Nolen, 1996). Students may have demands upon their time and energy that detract from school work (Barnett, 1998). Finally, students may rely on less-than-optimal strategies unthinkingly as a habit (e.g., students may feel compelled to highlight text with yellow marker because "that's just the way I always study."

For reasons such as these, I suspect that theoretical models may be describing an idealized self-regulating learner that teachers rarely see. Think-aloud methodology was selected, hoping it would be sensitive to subtle changes in strategies (Pressley & Afflerbach, 1995). Using think-aloud methods to provide a "window on comprehension" has been increasingly popular in recent years. Popularized by Ericsson and Simon (1984), a comprehensive review of reading research using this technique can be found in Pressley and Afflerbach (1995). Two recent studies published in the Journal of Educational Psychology illustrate the value of this methodology. First, a paper by Crain-Thoreson, Lippman, and McClendon-Magnuson (1997) found that prior knowledge was not related to comprehension, nor were strategies such as paraphrasing the text. These authors used their think-aloud data to illustrate the complex and dynamic nature of text comprehension. A second paper in the Journal examined experienced teachers as they professional papers in their area of expertise (Shearer, Lundeberg, and Coballes-Vega, 1997). These authors illustrated the personal nature of reading and how reading is guided by individual goals. In summary, I choose the think-aloud methodogy to provide a measure sensitive to the subtle changes and adaptations in studying that constitutes self-regulation

Methods

Participants

Eight volunteers (five females) from one section of an undergraduate Educational Psychology class participated in this study. All were college sophomores or juniors, majoring in Education, and taking their first course in Psychology. Students came to the lab one or two days prior to each of the regularly scheduled classroom tests (which were approximately one month apart). While they were required to use their textbooks, students were given no specific

instructions on how to study.

Procedures

The procedures for collecting data followed the recommendations of Pressley and Afflerbach (1995). Each individual was tested individually in a room with a work table and a tape-recorder. Instructions encouraged participants to read aloud and to state whatever was on their mind as they read. Several examples, covering a range of topics, were provided. These included emotional reactions ("I'm bored"), statements about prior knowledge ("This was covered in class"), evaluations ("I don't understand this"), and irrelevant thoughts ("There is noise in the hallway"). Instructions emphasized stating whatever was on their mind without justification ("You don't have to explain why you are underlining this point, just state that you are underlining the section about ..."). At the first session, brief practice was provided. A one-page essay from Newsweek was provided and students were closely monitored. While most did this with no problem, two expressed discomfort and choose not to read aloud during their sessions. With this minor exception, all participants had no problem with the assigned task. In the second and third sessions, students were simply reminded of their task; no practice was provided. Students were monitored throughout their forty-five -minute sessions. After brief periods of silence (1 minute), they were asked what they were thinking at that moment and reminded to think aloud as they studied.

Scoring

Scoring focused upon searching the tapes for evidence of strategies described in Pressley and Afflerbach (1995). Having listed the categories and organized them as detailed in their book, we then tried scoring three tapes from pilot subjects. One immediate observation was that many categories never occurred. For example, our subjects never engaged in any prereading activities. They simply launched right into the text by reading aloud. Other categories seemed to overlap so that student comments could be scored more than one way. For example, one category was carrying on a conversation with the author. For some of the students, this was all they did. But in each comment, they either commented on how it related to their own experience or on the

quality of writing. With modifications, we arrived upon four general categories. First, use of prior knowledge was coded when students relied upon their own experiences as a student or practice teacher or integrated text information with material from other classes or from lecture. Second, elaboration occurred then students "went beyond the information given" to generate examples or to explain why a text statement made sense (or did not make sense) to them. Third, use of strategies was coded when students engaged in deliberate attempts to clear up confusion (such as rereading a sentence) or used a memory strategy (such as adding a key term to a running list the student kept). The fourth category was text analysis. This category included comments about the quality of the text ("This is really boring" and "I like this example") and the value of the text ("I'll bet this table is going to be on the test" and "Does she really think this stuff is important?"). A sample of 5 tapes were scored by two researchers, who were in agreement on 94% of all categorizations.

Results

Both quantitative and qualitative analyses were conducted. For the quantitative analysis, the number of comments falling into each of the four categories was correlated with achievement on each of the three tests. These correlations are presented in Table 1. As you can see, elaboration and monitoring were positively correlated with achievement. Use of strategies and comments about the text showed weaker correlations with achievement. Two qualifications are in order here. First, due to the small number of participants, these correlations may be spurious. With only eight subjects, a correlation of .66 is required for statistical significance. Second, the qualitative analysis demonstrates a wide range in the how the subject used the strategy that we are inferring based upon their comments.

In observing these students, discussing their exam preparation with them, and listening to the tapes, four noteworthy findings emerged. First, there were wide individual differences in strategies employed in the task. Recall that students were instructed to schedule their sessions 1 or 2 days before each test. Five of the students came to the session with the chapters already read and highlighted. Their sessions were mostly reviews of their highlighted main ideas. These

subjects related prior experiences to the text information and they integrated text material with class notes. For example, one student reviewed a table of applications of Piaget's stages with comments like "that makes sense because..." and "that's like an example in class yesterday." On the other hand, three of the students were reading the text for the first time. One student typed key terms into outline format on her notebook computer, while the other two read word-for-word with no apparent strategies. These students covered very little material during their sessions and expressed no intention of returning to the material again before the test. Of these three students reading the text for the first time, two received the lowest scores among the eight students in the sample (and in the class, for that matter).

A second pattern that emerged was wide variations in the quality of strategy use. Five of the eight students carried on a running conversation with the author, a behavior typical of experts in a field (Wyatt, Pressley, El-Dinary, Stein, Evans, & Brown, 1993). These conversations usually took the form of an evaluation based upon prior knowledge. Two students often disagreed with the text's author. One student would first paraphrase the idea and then give a counterexample from his experience as a student. However, after reading a similar idea, another student commented "maybe that just depends upon the situation" and then moved onto the next idea. Another category of response was evaluation of the text. These, too, varied widely. One student critiqued the text with comments such as "Wow! That was a long sentence." Another student critiqued the text with "this section seems easy because it matches what we did in class." Organizing student comments into general categories, as I did for the quantitative analysis, is misleading because it fails to account for the depth and appropriateness of the processing. The thread running through these examples is the variations in applying the strategies lumped together into categories. As researchers and instructors, we need to focus less attention on what strategies students use, and more on "how?" and "how well?" students them.

A third finding is that explicit reference to strategies was rare. Several students had already highlighted their text, but no revisions of these were attempted. Three subjects never used a deliberate learning tactic. Two students used rereading, but only on a handful of occasions. No

students asked themselves questions or constructed concept maps, two strategies taught in their course and receiving support in the research literature (Hadwin & Winne, 1996). The finding of little strategy use is consistent with survey research (Barnett, 1998) and with previous think-aloud studies (Cordon & Day, 1996). This lack of strategy use is troubling in the light of the relationship between strategy use and achievement.

The fourth and final pattern to emerge is that few students showed any evidence of self-regulation, defined as adapting studying across the semester. Two students increased their focus on terminology in response to test questions requiring technical terms. Similarly, a third student decreased his running commentary on the text and increased his use of memory strategies, because he found he understood the text as he read it, but later could not retrieve the material. The remaining five students were highly consistent in their use of (or lack of) strategies across the three tests. Not surprisingly, the three self-regulating students received the highest grades among the eight participants in the study.

Discussion

The purpose of this study was to describe how students read their textbooks to prepare for exams. I hoped the think-aloud methodology would allow access to students' cognitive processing and serve as a sensitive measure of the cognitive and metacognitive processes in studying.

The results of this study are similar to those of a recent study by Crain-Thoresen et al. (1997). The same general categories of student statements emerged in both studies. A second similarity is that the quality of strategy use, not simply using the strategy, is the important variable. In their words, "not all paraphrasing is equal" (pp. 588). Unlike the Crain-Thorsen et al paper, I found that relying on prior knowledge was correlated with achievement. The primary difference between these two studies is the Crain-Thoresen study was a laboratory experiment, with students asked to study and take tests over material that made no real difference to them. In my research, students were reading their texts to prepare for a real classroom exam that would count for a major portion of their course grade.

The present study also produced results similar to those described in a recent paper by Shearer et al. (1997). Examining teachers as they read professional journals, Shearer et al. found reading to be a very personal, dynamic process. They warn against readers becoming too busy with personal interpretation and not basing their understanding upon the text. For some students in my study, relying on personal experience was a double-edged sword. On the one hand, it may make material more personal and meaningful, thus easier to understand. However, the goal is to learn the material as presented in the text. To spend time and energy arguing with the author, especially when the goal is to pass a test over the material, may be self-defeating.

Two brief implications can be drawn from this study. First, strategy use was very low, even among sophomore and junior education majors in an Educational Psychology. Learning strategies and metacognition are covered as part of the course content. These students had all been exposed to a "learning to learn" section in their "freshmen seminar" class. The low level of sophisticated strategy is consistent with previous research, this finding is discouraging. While self-regulation may be a worthy goal (and characteristic of the good students in this study), it is very difficult to achieve. The training offered by colleges and universities in learning and studying is inadequate (Hadwin & Winne, 1996). The data presented here suggest that the problem is not just using good strategies, but using them well.

A second issue raised by observing and discussing studying with the participants in this research is their difficulty with the traditional instruction to "read the text." This may be too vague for many students. For some of the participants in this study, running their eyes over the pages a day or two before the test constitutes adequate preparation. Discussion of how to read the text, or assignments that require students to use their reading materials in constructive ways, may be required for some of our students, even at the university level.

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Table 1

Correlations between type of statements in the think-aloud protocols and achievement on classroom tests.

Category	Test 1	Test 2	Test 3
Elaboration	.54	.86	.39
Monitoring	.67	.78	.32
Strategies	.13	.54	.20
Text-related	.26	.34	-.35

Table 2

Descriptive statistics for the think-aloud categories and test scores across the 3 tests

	Test 1		Test 2		Test 3	
Category	M	sd	M	sd	M	sd
Elaboration	3.88	2.70	3.63	3.74	3.38	3.38
Monitoring	5.88	5.38	5.5	5.58	6.25	6.65
Strategies	1.75	2.05	2.38	2.07	3.25	2.05
Text-related	2.13	2.10	1.50	1.69	1.13	1.27
Test scores	83.88	9.85	75.75	13.37	78.25	16.23